

Desired Future Habitat Conditions In Pool 6, Mississippi River

Description Of Pool 6

Pool 6 is an impoundment of the Mississippi River resulting from the operation of Lock and Dam 6 as part of the 9-foot channel navigation project. Construction of Lock and Dam 6 was completed in 1936. Pool 6 and its associated floodplain encompasses approximately 22,000 acres from approximately river mile 714.2, near Trempealeau, Wisconsin, upstream to river mile 728.4 near Winona, Minnesota. In general, the landward boundaries of the Pool 6 planning area are the I & M Rail Link railroad on the Minnesota side and the Burlington Northern Santa Fe railroad on the Wisconsin side of the Mississippi River.

The connectivity of the floodplain in Pool 6 has been highly altered. Levees are present in much of the floodplain near Winona, Minnesota and as part of the Trempealeau National Wildlife Refuge in Wisconsin. The levees in the Winona area were constructed for the purpose of flood control and were constructed in 19???. The levees surrounding the Trempealeau NWR were once used for agricultural purposes and later as the Delta Game and Fish Farm. This area was acquired by the U.S. Fish and Wildlife Service in 19?? and has been operated as a refuge since then. Additionally, the Burlington Northern Santa Fe railroad embankment forms a portion of the Trempealeau NWR levee system and further isolates additional floodplain area upstream of the refuge. Both of these features were present before the locks and dams were constructed, but have been upgraded and maintained over the years.

Transportation features further segregate the connectivity of the floodplain. Two active railroad embankments on the Wisconsin side of the River have embankments far out into the floodplain of the Mississippi River. This is unusual in that for most of the St. Paul District, the railroads run parallel to the River's floodplain at the base of the bluffs. Additional loss of connectivity has occurred due to the construction of roads across the floodplain in the Winona, Minnesota, area. These railroad embankments and roads in Pool 6 have "dissected" the floodplain into large isolated backwater complexes with little or no connection to the Mississippi River. This limits the temporal and spatial connectivity of the floodplain for many aquatic organisms.

Pool 6 has a small area which is classified as impounded due to the constricted nature of the floodplain. The isolated and non-isolated backwater complexes display the braided channel system which is a common feature of much of the River floodplain in the St. Paul District.

The major tributary entering Pool 6 is the Trempealeau River. The wetland area at the confluence of the Mississippi and Trempealeau Rivers has experienced considerable sedimentation due to inputs from the Trempealeau, constriction of the it's floodplain by the Trempealeau NWR and the constriction imposed on it by the narrow bridge opening where the Burlington Northern Santa Fe railroad crosses over the Trempealeau River. Other smaller tributaries enter on the Minnesota side and include Trout Creek and Gilmore Creek.

Pool 6 is also unique in that during high water events, much of the lower pool is subject to relatively natural flow conditions. Pool 6 has a narrow floodplain imposed by geologic and human influences. Coupled with this is that Lock and Dam 6 has a spillway, which in combination with the gates used to control water levels allows a large percentage of the floodplain to be subject to flows during flood events.

Pool 6 has a low frequency of dredging for maintenance of the main channel when compared to other pools in the St. Paul District. This also means that the quantity of material removed is one of the lowest in the district as well.

Description of Pool 6 Sub-Areas

Several identifiable areas are present within Pool 6. The boundaries of these area can be roughly defined based on hydrologic units (i.e. main channel, tributary deltas or bluffs). The following areas have been delineated to facilitate presentation of desired future habitat conditions in the pool:

Upper Pool 6: river miles 726.2-728.4 -- This area is bordered on the upstream end (west) by Lock and Dam 5A, Winona on the south, and the main channel to the east and north. A spillway in Lock and Dam 5A provides water flow through Straight Slough. However, some of the other water bodies in this area have been blocked to flow by the 5A dike. Also in this area is a large barge terminal in pool 6. Shoreline erosion from recreational traffic is an issue in this area.

Winona Backwaters: river miles 727.1-731.0 (727.1-728.4 in Pool 6) -- This area is surrounded by the Winona flood control levee with the cities of Goodview and Minnesota City on the south and west and Winona to the north and east. This area was isolated from the Mississippi River in 19???. Impacts from development, sand and gravel operations and urban runoff threaten the habitat quality in this area. However, the present wetland community is considered good even though access to the area by aquatic organisms living in the Mississippi River is limited.

Sam Gordy's Slough Backwater Complex: river miles 723.9-728.3 -- The main channel forms the eastern, western and southern boundary with the Wisconsin mainland and Burlington Northern Santa Fe railroad being the northern boundary. The railroad severely limits connectivity to a vast amount of floodplain habitat in this area. Non-isolated backwaters of the Sam Gordy's complex have experienced moderate levels of sedimentation and island dissection. Within the complex are several centrarchid overwintering sites which vary in their quality of habitat with some going anoxic during severe or prolonged winters.

Blacksmith Slough Area: river miles 718.0-723.9 -- The main channel forms the eastern, western and southern boundary with the being the northern boundary Burlington Northern Santa Fe railroad on the Wisconsin side and separating it from the Trempealeau NWR area. The dominant aquatic feature in this area is Blacksmith Slough which parallels the Burlington Northern Santa Fe railroad. The habitat quality of the area appears good for riverine species of fish, but limited for backwater species due to a loss in aquatic vegetation, island dissection and island erosion. An area between the main channel and Blacksmith Slough was dredged as a borrow source for construction of dike A as part of the Trempealeau NWR Habitat Rehabilitation and Enhancement Project constructed from 1996-1999. During dredging operations in the fall of 1996, the contractor complained of reduced productivity because of strong currents in the area which they believed carried sediment (sand) downstream. After the flood of 1997, an island was formed in Pool 6 approximately 2.5 miles south of the dredging location. There may be some connection between the "loss" of productivity and the formation of a new island.

Trempealeau National Wildlife Refuge Area: river miles 717.8-725.8 -- Bordered on the north and east by the Wisconsin mainland and Trempealeau River and west and south by the Burlington Northern Santa Fe railroad the entire is within a leveed area isolated from the main flow of the Mississippi River. This entire area is sequestered from the Mississippi River and offers no connectivity to the River although gravity dewatering of the area is dependent on River stages. Three interior dikes, 3 pumping stations, and one inlet from the Trempealeau River were constructed as part of Trempealeau NWR HREP in 1996-

1999. These levees and pumping stations increased management flexibility within the refuge and provide for more consistent production of desirable waterfowl habitat during fall migration.

Trempealeau River Delta: river miles 717.0-719.0 -- The Trempealeau River delta area is bordered by the Wisconsin mainland to the north and east, the south by the Burlington Northern Santa Fe railroad, and to the west by the Trempealeau National Wildlife Refuge dike. The Wisconsin shoreline is owned by the State of Wisconsin and managed as Perrot State Park. Prior to construction of the levees and railroad embankment, this area was connected to the Mississippi River from the up stream and down stream directions. The construction of the levees also rerouted the Trempealeau River from river mile 721.8 to its present location at 717.0. This area has had rapid sedimentation from bed and suspended load contributed from the Trempealeau River watershed.

Lower Pool 6: river miles 714.2-719.1 -- The northern boundary is formed by the Burlington Northern Santa Fe railroad in Wisconsin, the southern boundary is the I & M Rail Link railroad on the Minnesota side, Lock and Dam 6 is the eastern boundary and the western boundary is the lower end of the Blacksmith Slough Area. Some island erosion has occurred in this area which does limit the distribution of aquatic vegetation. However, fine sediment deposition from Trout Creek watershed, sand deposition from the Mississippi River and water velocities combine to influence the distribution of aquatic vegetation. Sedimentation also is impacting some of the secondary channels within this area, to the extent of cutting some off from flow.

Unique Attributes, Opportunities And Constraints

One opportunity, but also a constraint, is the presence of numerous transportation and flood control structures which reduce the connectivity of aquatic habitats in the pool. Any modifications of these structures will need to be intensively evaluated and include considerable opportunities for public involvement in the decision making process.

Summary Of Actions To Achieve Desired Future Habitat Conditions

Often the actions proposed and described above are interrelated and specific actions will require overlapping solutions. The goal of these actions is to increase diversity in the pool. This diversity may be biological, such as the number of fish or wildlife species affected. Meeting the goal may be reflected in habitat diversity, such as side channel reformation, acres of islands restored, or increased acres of emergent plants present. Increasing and sustaining a diverse aquatic and terrestrial habitat base in the pool is the key to improving the health of the Mississippi River.

1.) Maintain existing quality habitat.

A key to the desired future is to protect and maintain existing terrestrial and aquatic habitat. Some areas within the pool are considered as quality habitat for a variety of species. Maintenance of existing quality habitat may be as simple as leaving it alone and monitoring it's condition. Specific actions would be identified if long-term declines in habitat quality in the area are noticed.

2.) Protect and restore islands.

Stabilization of islands in Pool 6 will be undertaken to reduce the rate of island erosion and island dissection. This will help maintain a diversity of depths, velocities and substrate. It will also keep selected backwater areas free from flow.

Floodplain structure will be restored and enhanced in Lower Pool 6. Island formation will be promoted. Some island formation is occurring in Lower Pool 6 due to sand deposition from the main channel and as a delta at the mouth of Trout Creek. This island formation will be encouraged, and if necessary, additional islands will be constructed in this area. Where necessary, islands will be constructed to improve terrestrial and aquatic habitats. The constructed islands will be oriented to promote scour and sediment deposition to increase depth, velocity and substrate diversity. The islands will improve water quality conditions (decrease sediment resuspension) and promote the establishment and maintenance of aquatic vegetation.

The primary location where islands will be formed to restore and enhance floodplain structure will be in the Lower Pool 6 area. Islands in this area will also improve habitat diversity and quality through the promotion of secondary and tertiary channel development and diversification of water velocities in the impounded reach.

3.) Increase depth diversity in channels and backwaters.

Managing sediments in Pool 6 is important in maintaining, enhancing or restoring habitat. In the main channel, recommendations contained in the Channel Maintenance Management Plan must be followed. The opportunity for using dredged material from the main channel to construct islands is limited. Historic dredged material placement sites will be restored to native plant communities.

Actions to maintain, enhance or restore side channel and tertiary channel areas will be considered. Sediment scour in these channels may be promoted by directing flow. A diversity of depths, velocities and substrates should be carefully planned.

Sediment management in backwater habitats is also important. Depth diversities should be maintained, enhanced or restored. Dredging, directing flows or other techniques may be used to optimize depth diversity.

Many of the backwater habitats have experienced excessive inputs of flowing water and sediments. If this continues, especially during low flow conditions, it may be appropriate to close off this flow and sediment source.

Efforts will be made in the upper and lower sections of the pool to increase secondary and tertiary channel habitat. Maintenance and formation of these channels will consider a variety of factors aimed at providing for a diversity of habitats (undercut banks, mud banks, snags, etc.) and substrate types. Where feasible, restored channels will be defined by land border to further diversify the habitat these channels will provide. Maintenance and development of secondary and tertiary channel habitat will occur in the Sam Gordy, Smith Slough and Lower Pool 6 areas. Backwater habitats in these same areas will include at least two centrarchid over-wintering sites each as part of restoring the backwater communities.

4.) Manage floodplain forest and prairie communities for diversity and quality.

Managing terrestrial plants will focus on maintaining, enhancing and restoring healthy forest communities interspersed with grasslands and wet meadows. Management actions include restoring historic dredged material placement sites with native plants; decreasing the dominance of reed canary grass; protecting, restoring and enhancing prairie communities and managing for their continuance; and reducing or eliminating purple loosestrife by continuing control methods and implementing new ones. Privately owned property may be managed through landowner education and incentives, conservation easements or purchase from willing sellers.

Efforts will be made to promote the development and maintenance of mud flat and sand bar habitat. Due to sediment input to pool, sand bar habitat has a high potential of being encouraged, but mud flat potential is low. If mud flat habitat does occur, it is quickly colonized by plants. These habitats are important for shorebirds, turtles, have differences in plant germination dependent on substrate type and can be a good food and spawning resource for fish and wildlife.

The present forest community dominated by maple is not long lived nor is regeneration of the forest community occurring due to many factors (higher water table, reed canary grass, land elevation, etc.). Forest management will include measures to restore disturbances and control of reed canary grass (logging, maybe floodplain dynamics) in the varies locations throughout the pool. However, consideration will be given to include management of some of the areas which are homogenous in species composition/age, but valuable for other species that need large tracts of unbroken forest. Also, land management practices will take into consideration unique needs of state and federal endangered and threatened species.

Prairie restoration will occur in the Trempealeau National Wildlife area and Perrot State Park. A variety of measures will be implemented may include incentives for private landowners to restore prairie, easements and acquisition from willing sellers.

Connectivity for terrestrial species will be addressed through the management of habitats in optimal blocks to meet a critters needs. This may include the development of "travel" corridors between larger blocks of habitat or managing for large blocks of habitat.

5.) Manage water levels to improve aquatic habitat.

Managing aquatic plants will focus on maintaining, enhancing and restoring healthy submergent, floating and emergent plant communities with optimal distribution and high diversity. Historic aquatic vegetation conditions represent an optimal mosaic and assemblage of habitat desired for lower Pool 6. However, some areas now are more conducive for other purposes or communities. Any description of desired vegetation communities must consider that areas void of vegetation are also important. For lower Pool 6, it is reasonable to expect emergent vegetation to the 1 foot depth, mixed to 2.5 feet and submersed out to 6 feet. The submersed vegetation would be a transition of almost 100% coverage in shallower depths (<3 feet) to less than 5% coverage at the 6 foot contour. The exact location of aquatic vegetation will vary due to substrate, water velocity and wind fetch which in combination will affect specie composition, density and diversity.

Island construction may also be used to improve water quality conditions by decreasing sediment resuspension. This would promote the establishment and maintenance of aquatic vegetation.

Aquatic vegetation diversity and coverage will be enhanced in the lower Pool 6, Blacksmith Slough backwater complex and the Trempealeau NWR areas through modifying flow distributions, increased light penetration through island formation, changes in sediment characteristics, and implementation of periodic water level management in the Trempealeau NWR and if practical, pool wide.

6.) Manage river flows and connectivity to improve aquatic habitat.

Human alterations have resulted in numerous changes to the water flows within Pool 6. Identification and modification of channel training structures to promote a diversity of aquatic habitat will be done. Modifications of the various structures within the floodplain (road and railroad embankments, levees) will be investigated to improve the hydraulic connectivity of the floodplain in this area without compromising their intended purpose.

Measures will be taken in all areas of the pool to restore and maintain aquatic and terrestrial connectivity to assure the habitats are available and accessible at the time fish and wildlife need them to meet life cycle needs. For aquatic organisms, this will entail modification of closing structures, promoting the formation of or creating channels, and removals of any barriers to increase the spatial and temporal connectivity of habitats. Connectivity with pools 5A and 7 will be improved through the implementation of structures or dam operation measures to increase fish passage at these dams.

7.) Support watershed management programs.

Positive land use in the tributary watersheds should be encouraged that will reduce sediment, nutrient and other pollutant inputs into Pool 6. Urban areas are also included within the watershed and along the river. Solutions to eliminating point source pollution should be supported and implemented.

8.) Work cooperatively with private property owners.

There are several areas within the Mississippi River floodplain and the majority of the tributary watersheds which are privately owned. Maintaining and improving habitat within the floodplain of the Mississippi is dependent on a long-term commitment to provide resources to private landowners to improve water quality, reduce erosion and sedimentation, and improve habitat conditions on land within the floodplain. Various approaches and techniques will be evaluated and implemented to work cooperatively with private property owners. Some of the tools include: voluntary measures, land owner incentives, easements from willing owners and purchase of land from willing sellers.